

DOUBLE-FLOW EXHAUST SYSTEM FOR AN INTERNAL-COMBUSTION
ENGINE

[0001] This application is a National Phase of PCT/EP2005/002727, filed March 15, 2005, and claims the priority of DE 10 2004 022 721.7, filed May 7, 2004, the disclosure of which is expressly incorporated by reference herein.

BACKGROUND AND SUMMARY OF THE INVENTION

[0002] The present invention relates to a double-flow exhaust system for an internal-combustion engine, and more particularly, to an exhaust system having exhaust-gas-carrying pipes, and at least one muffler and catalyst housing.

[0003] DE 199 32 349 A1 shows a double-flow exhaust system of a motor vehicle in which two exhaust lines are guided together at the end into a common end muffler housing. A tail pipe, by way of which the exhaust gases are discharged to the outside, is fastened to the end muffler housing. As illustrated in Figure 1 thereof, each exhaust line consists of several assemblies, such as the exhaust gas [[elbow]] manifold, the catalyst and the end muffler which are assembled by way of

corresponding exhaust pipes and flange-type connections.

[0004] An object of the present invention is to provide the assemblies of the exhaust system such that, on one hand, the free installation space in the area of the exhaust tail pipe is increased and, on the other hand, the mounting of the entire exhaust system is facilitated.

[0005] This object has been achieved by providing a separate end muffler for each exhaust line, the end mufflers being fluidically connected by at least one mountable connection pipe.

[0006] As a result of the fact that the two exhaust lines each have a separate end muffler, which both are fluidically connected by way of at least one mountable connection pipe, the space obtained between the two faces can be utilized for placing and developing the exhaust tail pipe. Furthermore, by separating the two exhaust lines in the area of the end muffler, the individual exhaust line can be assembled as a preassembled constructional unit in order to then complete it on the vehicle to form the entire exhaust system. By separating the U-shaped entire exhaust system in the area of the end muffler, a transport of the preassembled constructional unit also becomes possible without any problem.

[0007] A first connection of the two end mufflers takes place by way of a T-pipe piece which, via its two first pipe ends, is connected with the two end mufflers, while the third pipe end is used as an exhaust gas outlet. In this embodiment, a tail pipe with a tail pipe cover is mounted on the third pipe end of the T-piece.

[0008] Advantageously a second connection pipe between the two end mufflers contributes to the muffling of noise, particularly of the low-frequency fractions in the low rotational speed range. Simultaneously, a torque increase is obtained in the low rotational speed range. Here, the course and the position in the rotational speed band of the torque increase and of the noise muffling can be significantly influenced by the targeted adaptation of the pipe length and of the pipe cross-section.

[0009] The mountable second connection pipe consists of two connecting pieces connected with the respective end muffler housing, onto which connecting pieces a sliding sleeve is pushed and whose axial positioning or securing can be achieved, for example, by a clamp.

[0010] Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a top view of an exhaust system;

[0012] Figure 2 is a perspective frontal view of the exhaust system of Figure 1, and

[0013] Figure 3 is a perspective rear view of the exhaust system shown in Figures 1 and 2.

DETAILED DESCRIPTION OF THE DRAWINGS

[0014] The double-flow exhaust system for a 6-cylinder engine has a respective exhaust manifold 2, 4 which is by its respective flange section 6, 8 on the cylinder head of an engine unit (not shown). The three individual pipes of the exhaust manifold 2 and 4 lead into one exhaust gas collecting pipe 10, 12 respectively which is adjoined by a housing 14, 16 respectively of a starting catalyst. Each exhaust pipe 18, 20 respectively is connected to the starting catalysts 14, 16 by a detachable flange connection 19, which exhaust pipes 18, 20

each lead to one housing 22, 24 respectively in which a main catalyst is accommodated. The main catalysts 22, 24 are each accommodated in an end muffler housing 26, 28 respectively or are partially integrated therein. Both end muffler housings 26, 28 are fluidically connected with one another by way of a first connection pipe designated generally by numeral 30, in the following description referred to as a lower connection pipe.

[0015] The lower connection pipe 30 is constructed as a T-pipe piece on whose free connecting piece an exhaust pipe cover 34 is fastened, while the connecting pieces are fitted onto a pipe connecting piece of the respective end muffler housing 26, 28 and are secured by two fastening clamps 34. A second connection pipe 36, in the following description referred to as an upper connection pipe 36, extends above the lower connection pipe 30 and consists of two connecting pieces 36a, 36b extending out of the respective end muffler housing 26, 28. The two ends of the connecting pieces 36a, 36b are spaced away from one another while being aligned with respect to one another on the face-side. The forming gap A is covered by a sliding sleeve 36 (shown only in Figure 1) which is axially secured by clamps (not shown). Thus, the two connecting pieces 36a, 36b and the mountable sliding sleeve 36c allow a second gastight connection to be established between the two end muffler housings 26 and 28 by way of the connection pipe 36.

[0016] For the suspension or fastening of the entire exhaust system, a fastening device is provided which has a carrier plate 40 fastenable to a transmission as seen in Figure 3. A lower pipe stay 42 is fastened to the carrier plate 40, to the left and right supporting leg 42a, 42b respectively of the pipe stay 42, one fastening clamp 44, 46 respectively being provided which reaches around the housing of the respective starting catalyst 14, 16. The lower pipe stay 42 is supported by two tension struts 48, 50 elastically disposed on the carrier plate 40.